Gnetum resemble those of angiosperms in their internal structure as well as in their general appearance.

The conclusion for the entire group of gymnosperms is that the leaves belong to a single xerophytic type, with *Ginkgo* and *Gnetum* as the only exceptions. The literature list is very incomplete, because it was not thought necessary to repeat references which can be found in standard texts.—C. J. CHAMBERLAIN.

Respiration of thermophiles.—The respiratory activity of the thermophile fungi, *Thermoascus aurantiacus*, *Anixia spadicea*, and others, has been studied by NOACK,[11] who finds that the high respiratory activity is directly related to the rapid growth rate of these organisms, and that it is merely a consequence of the high temperature, not due to specific constitution or peculiar enzyme equipment. The economic coefficient for young cultures is 1.8, and about 3.6 for older ones. The respiratory quotient with changing oxygen supply and different growth rates from changed sources of carbon remains near one, so that the only peculiarity is the high respiration. From a comparison of the temperature coefficient of respiration in thermophiles, which is about 1.7 within the temperature limits for growth (35°–55°), with that of *Penicillium*, which is about 2 at 15°–25° C., NOACK concludes that the thermophiles show a restricted respiration. Thus, *Thermoascus* produces 310 per cent of its dry weight of CO_2 in 24 hours. If the respiratory rate of *Penicillium* at 25° C. were quadrupled by a rise to 45° C., however, it would produce 532 per cent of its dry weight of CO_2 in 24 hours. From this consideration of the VAN'T HOFF rule, and the absence of abnormal behavior in respiration and growth, he concludes that the high respiration of thermophiles is merely a temperature consequence, and is really somewhat restricted for that temperature.

With regard to this use of the VAN'T HOFF rule, and the finding of a lower temperature coefficient of respiration for thermophile fungi at 45° C. than for *Penicillium* at 25° C., attention is called to a recent paper by MATISSE,[12] who criticizes the use of the VAN'T HOFF rule, and urges the adoption by biologists of the ARRHENIUS temperature law instead. The formula for the VAN'T HOFF rule is incompatible with that developed by ARRHENIUS, and the latter is now accepted universally by physical chemists. The curves developed from each formula are much alike at low temperatures, but the ARRHENIUS formula shows that as the temperature goes higher, the value of Q_{10} decreases. The lower temperature coefficient for thermophiles is exactly what one would expect according to the ARRHENIUS temperature law, and the argument that thermophiles show a restricted respiration for that temperature (45°) is probably not justified.—C. A. SHULL.

---

[11] NOACK, KURT, Die Betriebstoffwechsel der thermophilen Pilze. Jahrb. Wiss. Bot. **95**:413–466. 1920.

[12] MATISSE, GEORGES, La loi d'Arrhenius contre la règle du coefficient de température. Archiv. Int. Physiol. **16**:461–466. 1921.